

OPUNTIA DENSISPINA (CACTACEAE): A NEW CLUB
CHOLLA FROM THE BIG BEND REGION OF TEXAS

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ABSTRACT

Opuntia densispina (Cactaceae) a new species in the series *clavatae* from Texas is described and illustrated. The new species has close affinity to *O. emoryi* of the *Opuntia schottii* complex in Texas. Morphological, chromosomal and phenological characters which distinguish this species from other taxa in the *Opuntia schottii* complex are provided.

A recent systematic study of *Opuntia* series *clavatae* (sensu Benson 1982) subgenus *Cylindropuntia* included the taxa *Opuntia schottii* Engelm., *O. grahamii* Engelm., and a newly recognized species, *O. aggeria* Ralst. & Hils. (Ralston and Hilsenbeck 1989). These taxa composed a part of the *O. schottii* complex in Texas as defined by Benson (1982) and Ralston (1987). Observations made from both herbarium collections and field work indicated that large variation existed within populations of *O. aggeria* found in Big Bend National Park. Further critical study of this variation, involving both morphological and chromosomal analysis, determined that another entity, found sympatrically with *O. aggeria*, deserves specific taxonomic rank. The species is proposed here.

Opuntia densispina Ralston & Hilsenbeck, sp. nov. (Fig. 1).—TYPE: U.S.A., Texas: Brewster County, Big Bend National Park, 5.3 mi NE of Solis' Ranch on Old River Rd, on clay slopes. 15 May 1989, *Ralston 200* (holotype SRSC, isotypes TEX, ASC).

Opuntia schottii Engelm. et *O. emoryi* Engelm. similis sed ab utroque differt articulis in catenis brevioribus et areolis minoribus (a 4 mm longis) glochides numerosas a 1 cm longas ferentibus. Differt a *O. schottii* spinis sine marginibus carinitis. Differt a *O. emoryi* articulis et tuberculis brevioribus angustioribus.

Plants forming low sprawling mats to 12 cm high, 3 m wide. Roots fibrous. Branches forming short chains, new growth emerging from lateral areoles of previous year's growth; joints 45–70 mm long, 35

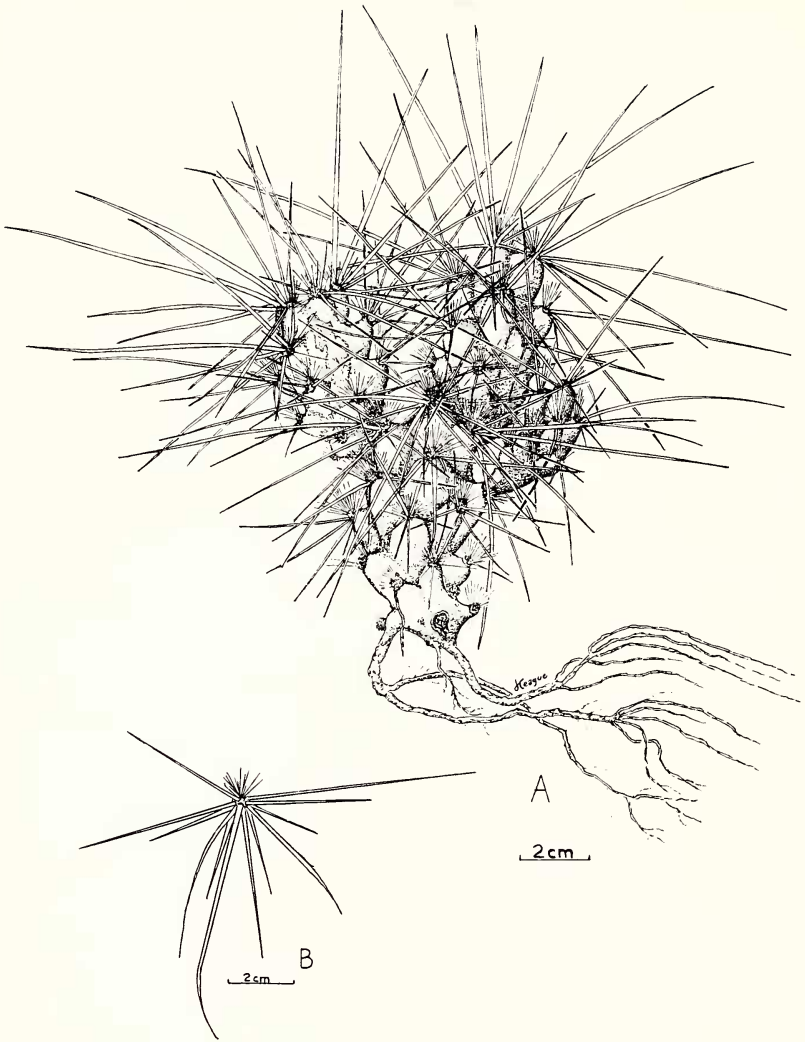


FIG. 1. *Opuntia densispina* Ralston and Hilsenbeck. A. Habit showing fibrous roots, and branching pattern of clavate stem-joints. B. Detail of spine cluster. Illustrated from live specimen *Ralston 200*.

mm wide; obovate to clavate; tubercles prominent, 15–20 mm long, 5–7 mm wide, 5 mm high, green; areoles ovate to 4 mm wide. Spines 11–14, flattened pink/white; 6–9 spines per areole 30–70 mm long with 1 central spine; 4 spines per areole shorter, 15–25 mm long, spreading, 2 spines deflexed; glochids abundant to 10 mm long. Flowers 50–70 mm long, 30–45 mm wide; petaloids in 3–4 whorls

TABLE 1. COMPARISON OF TAXA IN THE *Opuntia schottii* COMPLEX.

	<i>O.</i> <i>densispina</i>	<i>O.</i> <i>aggeria</i>	<i>O.</i> <i>emoryi</i>	<i>O.</i> <i>schottii</i>	<i>O.</i> <i>grahamii</i>
Root type	fibrous	tuberous	fibrous	fibrous	tuberous
Joint length (mm)	45-70	45-65	70-150	45-65	35-45
Tubercle size (mm)					
Length	15-20	10-20	35-50	15-20	8-12
Width	5-7	8-10	10-15	6-8	4-6
Height	5	5-7	10-12	6-8	4-6
Areole diameter (mm)	3-4	3-4	5-7	5-7	3-4
Spines/areole	11-14	7-9	11-16	8-14	7-14
Spine length (mm)	30-70	55-90	35-70	40-60	30-35
Central spine	yes	no	yes	yes	no
Chromosome number (<i>n</i>)	22	11	22	22	22
Phenology	May-Jun	Mar-Apr	May-Jun	Jun-Jul	May-Jun

grading from yellow green with central pink tinge to bright yellow in innermost petaloids; petaloids to 22 mm long, 15 mm wide, spatulate, apiculate; filaments red, 10 mm long; style cream, to 25 mm long; pericarpel obconic, 35-50 mm long, 10-25 mm wide with glochids to 5 mm long. Seeds cream to brown, 5 mm wide. $n=22$. Flowering mid May to early June.

The specific epithet is chosen to describe the dense appearance of the spine clusters of this species. As noted above, *Opuntia densispina* occurs sympatrically with *O. aggeria* in southern Brewster County, Texas, specifically in the extreme southern portion of Big Bend National Park. At first glance, *O. densispina* appears similar to *O. aggeria*. However, morphological and chromosomal differences exist between these two taxa, as well as between *O. densispina* and other taxa in the complex (Table 1).

Comparisons between *Opuntia densispina* and *O. aggeria* indicate that these taxa differ in root morphology, fibrous vs. tuberous; spines per areole, 11-14 vs. 7-9; spine length, *O. densispina* having shorter spines; chromosome number, $n=22$ vs. $n=11$; and phenology, *O. aggeria* flowering earlier than *O. densispina*. In addition, *O. aggeria* is found on loosely consolidated igneous or calcareous desert alluvium (Ralston and Hilsenbeck 1989) while *O. densispina* appears restricted to a clay substrate. *Opuntia densispina* differ from other taxa in the complex in the number of spines per areole, tubercle dimensions, root morphology, joint length, and phenology (Table 1). These differences are not uniform (i.e., in some cases such as spine length or number, there is overlap among taxa), but with respect to *O. aggeria*, the taxon found sympatrically with *O. densispina*, these characters do not overlap.

Pollen studies of the *Opuntia schottii* complex show only slight interspecific variation, mostly in grain size, number of pores and angularity of the grains (Ralston 1987). Grain size differs between *O. densispina* and *O. aggeria*, with *O. aggeria* pollen measuring 70 m in diameter and *O. densispina* measuring 105 m in diameter (Hilsenbeck and Ralston unpublished). Pollen stainability, determined by using cotton blue in lactophenol (Radford et al. 1974), and inferred viability indicate that stainability and corresponding fertility of *O. densispina* grains vary from 93 to 85%, with some samples registering 0% stainability (based on five samples at 200 grains per sample). The viable and morphologically distinctive pollen further supports the recognition of this species.

Of the remaining taxa in the complex, *Opuntia densispina* shows closest affinity to *O. emoryi* and to *O. schottii*. All three taxa possess fibrous roots, numerous spines per areole and all are tetraploid species. These species differ in joint length, tubercle dimensions and spine length with dimensions for *O. densispina* usually falling between the two other taxa (Table 1). *Opuntia densispina* is clearly a distinctive taxon worthy of specific rank. Because this cactus has been found only at its type locality, further surveys for this species in southwest Texas and adjacent Mexico are warranted, both to document variation that exists in this species and to supplement information concerning the geographic distribution of cacti found in the series *clavatae*.

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